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EXPLORATION TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

June 11, 2004

OK

TO: Internal File

THRU: Peter H. Hess, Environmental Scientist III/Inspector, Team Lead PHH by an

FROM: Priscilla W. Burton, Environmental Scientist III/Soils

RE: Coal Exploration for Seam Thickness and Quality, Canyon Fuel Company, LLC, Dugout Canyon Mine, C/007/039, Task ID #1916

SUMMARY:

On February 9, 2004, Ark Land Company (a subsidiary of Arch Coal Inc.) submitted a notice of Intent to Conduct Minor Coal Exploration within the 2,560-acre SITLA Dugout Coal Tract (T 13 S, R 13 E). The exploration area is located 15 miles northeast of Wellington in the Book Cliffs at elevations between 7,200 and 8,700 ft (Maps 1 & 2). Further information was received from the Applicant on April 29 and May 26, 2004, including soil descriptions.

The drilling program is planned for eight weeks in June through July of 2004 for holes DUG0104 and DUG0204, located in Sections 20 and 19 respectively (p 3 and Map 2). [DUG0204 will be drilled on an angle from an actively used road and will eliminate the need for DUG0105 and DUG0205 included in the previous application. Site DUG0204 was not in the previous application. It is noted in the current application that DUG0204 is also being permitted by the BLM.] Approximately 300 lbs of coal will be removed per hole, which places this activity in the Minor Coal Exploration category of the R645-201-200 rules. Reclamation in accordance with the requirements of R645-202 is required.

Both holes will be located at wide spots in previously existing ranch and logging roads (pg 1, 2). There will be no soil salvaged from drill hole DUG0204, and there will be no additional cuts required to widen the pad, except clearing of the existing road cut slope (see photographs in Appendix B (personal communication with Vicky Miller on June 10, 2004). Reclamation of the sites mostly entails the re-establishment of roadways, although some regrading to Approximate Original Contour (AOC) will be required at drill site DUG0104.

Appendix B of the submittal includes communication with the Thayn family as per the Surface Land Owner Agreement dated November 22, 1999, and First Amendment to Surface Use Agreement dated August 13, 2001 between Canyon Fuel Company (CFC) and Thayn. This letter outlines current and proposed disturbances on Thayn lands in conjunction with the SITLA lease.

EXPLORATION TECHNICAL ANALYSIS:

COAL EXPLORATION

Regulatory Reference: R645-200.

REQUIREMENTS FOR NOTICE OF INTENTION TO CONDUCT MINOR COAL EXPLORATION

Regulatory Reference: 30 CFR 772.10; 30 CFR 772.11; R645-100-412; R645-201-200.

Analysis:

The drilling program is planned for eight weeks in June through July of 2004 for holes DUG0104 and DUG0204, located in Sections 20 and 19 respectively (p 3 and Map 2). Drawings of the drill sites are found in Appendix A, Figures 1 and 2.

The 1988 Carbon County Soil Survey provides general descriptions of the soils in the locations of the proposed drill holes. Information from the 1988 Order III Soil Survey is summarized below.

DUG0104 is in Map Unit 97, the Rottulee family-Trag complex. Sixty percent of this map unit is the Rottulee family loam having 30 – 60% slopes; described as having a two-inch deep surface layer that is reddish brown in color. The subsoil is divided into a thirteen-inch reddish brown loam and clay loam and a lower eight-inch layer of reddish brown gravelly silty clay loam. **Shale is encountered at 34 inches.**

Twenty percent of Map unit 97 is in the Trag stony loam having 30 – 60% slopes. The surface layer is a ten-inch thick dark grayish brown stony loam. The 26 inches of subsoil is dark grayish brown clay loam. The substratum is dark grayish brown and very pale brown clay loam **extending to 60 inches or more.**

Since the Trag and Rottulee soils vary greatly in topsoil depth and depth to bedrock, and since there is a possibility that the DUG0104 lies in the 20% of the Map Unit described as "other soils", there must be a reconnaissance inspection of drill hole DUG0104 prior to

soil salvage to determine the depth of the topsoil layer to be salvaged and the potential for mud pit excavation. Or, alternatively, the Applicant could commit to the salvage of one foot of topsoil/subsoil from DUG0104 (or about 400 CY/0.25 ac) and eliminating a mud pit at DUG0104.

DUG0204 is in Map Unit 62, Midfork Family-Commodore Complex. Fifty percent of this unit is described as Midfork family bouldery loam having 50 to 70 percent slopes. The surface of the Midfork family soil is covered with a partially decomposed organic layer about two inches thick. The topsoil is brown bouldery loam about seven inches thick. Below this is a layer of yellowish brown very channery loam, ten inches thick. And below this to a depth of **60 inches or more** is yellowish brown very gravelly loam.

Twenty percent of this Map unit is described as Commodore bouldery loam, 50 – 70% slopes. The Commodore soil has an organic layer about one inch thick and a surface layer of brown bouldery loam about six inches thick. The underlying material (to a depth of 19 inches) is brown very stony loam. **Bedrock is between 10 and 20 inches.**

All holes will be located at wide spots in previously existing ranch and logging roads (pg 1, 2). Previously existing, 14 ft wide access roads will be graded, but not upgraded (widened) or graveled (p2 and Map 3). Drill sites will be at the locations of wide passing spots in the roads (p 8). Approximately 0.25 acres (100 X 100 ft) will be disturbed for each location (p 7).

Findings:

The information provided in the proposal describes protection of the topsoil resource by using existing roadways for the drill pads.

COMPLIANCE DUTIES

Regulatory Reference: 30 CFR 772.13; R645-202.

OPERATIONAL STANDARDS

Regulatory Reference: 30 CFR 772.13; R645-202-100.

Analysis:

Figures 1 and 2 in Appendix A provide more specifics on the size of the disturbance. There will be no soil salvaged from drill hole DUG0204, but it is likely that soil sloughed from the road cut at DUG0104 will be required to widen the pad slightly (Personal communication between Priscilla Burton and Vicky Miller on June 10, 2004).

Mr. Dan Larsen, Soil Scientist with Environmental Industrial Services, Inc. reported on the soils of the two sites in Appendix B. He indicates that there is topsoil along the road cut at site DUG0104 that is about 18 inches deep. The plan indicates that this topsoil will be stored with other cut material in the site berm (p 8). However, the Permittee will attempt to maneuver within the existing pad, without affecting the slope above the road cut, removing only the sloughed soil from the existing road cut. Then reclamation will entail replacing this sloughed material at an angle of repose and reseeding it (Personal communication between Priscilla Burton and Vicky Miller on June 10, 2004).

Findings:

The information provided in the proposal along with personal communication with Vicky Miller concerning the extent of the cut at DUG0104 adequately describes the methods of protecting the topsoil resource from adverse impacts associated with drilling activity.

RECLAMATION STANDARDS

Regulatory Reference: 30 CFR 772.13; R645-202-200.

Analysis:

Revegetation

Reclamation of the sites mostly entails the re-establishment of roadways, although some regrading to Approximate Original Contour (AOC) will be required at drill site DUG0104. Reclamation at DUG0104 will entail replacing cut material at an angle of repose and reseeding it (personal communication with Vicky Miller on June 10, 2004). Where topsoil is replaced, the soil will be gouged before seeding (p 8). The outslopes of pre-existing road berms and regraded, topsoiled areas will be seeded (p 6, p 8). If a mud pit is made, the material excavated will be returned to the pit, mixed with the drilling mud and compacted to re-create the road surface (p 8).

Boreholes

The drilling procedure will be continuous core or rotary drilling and spot coring. The holes will be sealed with cement, cement/bentonite slurry or bentonite chips. All bentonite and cement spilled during the sealing process will be buried in the mud pit or hauled off-site (p 4).

Findings:

Most of the disturbance is located in a roadway. The application has addressed the information required under R645-202-242 and R645-201-225. Although not affected by this drilling activity, the outslope of the pad fill would benefit from some gratuitous seeding to provide erosion control and enhance the riparian zone.

RECOMMENDATIONS:

Approval is recommended.

Although not affected by this drilling activity, the outslope of the pad fill would benefit from some gratuitous seeding to provide erosion control and enhance the riparian zone.

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